Image

A.F/1762

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re PATENT application of:

Applicant:	Dieter Döhring
Application No:	09/647,129
Filing Date:	September 26, 2000
Title:	METHOD OF IMPREGNATING DECORATIVE PAPERS
Examiner:	Elena Tsoy
Art Unit:	1762
Docket No.	TURKP0114US

APPEAL BRIEF

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The undersigned submits this brief in triplicate for the Board's consideration of the appeal of the Examiner's decision mailed July 16, 2003, finally rejecting claims 1, 3-5, 7 and 8 of the above-identified application. A check covering the fee for filing an appeal brief is attached.

I. Real Party in Interest

The real party in interest in the present appeal is Kronospan Technical Company Ltd.

II. Related Appeals and Interferences

Neither appellant, appellant's legal representative, nor the assignee of the present application are aware of any appeals or interferences which will directly affect,

which will be directly affected by, or which will have a bearing on the Board's decision in the pending appeal.

III. Status of Claims

Claims 1, 3-5, 7 and 8 are pending, stand finally rejected, and are the subject of this appeal. A copy of these claims is reproduced in Appendix A.

IV. Status of Amendments

There are no outstanding amendments.

V. Summary of Invention Defined in the Claims on Appeal

The invention defined in the claims on appeal relates to a method of impregnating paper used for the production of highly wear-resistant laminate flooring materials.

Background

Various processes previously were used to produce wear-resistant decorative paper impregnates for laminate flooring materials. According to one such process, a patterned paper is impregnated with resin, and then an additional layer of a resin composition containing abrasive particles is applied using a knife coater or spreading rollers. A problem with these prior art processes has been a lack of homogeneity of the abrasive particles, this giving rise to substantial variations in wear resistance of the

laminate flooring materials. To reduce these variations, conventional practice was to add viscosity increasing substances to the resin composition coating, and to employ very fine abrasive particles to prevent them from being precipitated from the resin composition used to form the additional coating layer. This practice, however, led to an optical dulling of the surface of the laminate flooring materials.

The Invention

The invention provides a solution to the aforesaid problem, by enabling the production of a laminate flooring material with uniform and high wear-resistance without the dulling of the surface that plagued the prior art processes.

In accordance with the invention, a method according to the invention comprises:

a) taking paper;

b) damping and impregnating the paper with an amino resin by the use of metering rollers; and

c) additionally spraying onto the damped wet paper an additional layer of amino resin in a dispersion containing an abrasive substance and a flow-promoting agent.

The final area density relative to the dry mass of raw paper amounts to 100% to 250%, and the dispersion comprises 100 parts of the amino resin, 20 to 95 parts of the abrasive substance, 0.5 to 2.5 parts of a silane adhesion promoter, 5 to 25 parts of a flow-promoting agent, 0.1 to 0.4 parts of a wetting agent, 0.05 to 0.4 parts of a separating agent and of an amino resin hardener.

As is preferred, a melamine resin is employed as the amino resin, polyglycol ether, e-caprolactam or butane diol is employed as the flow-promoting agent.

The abrasive substance comprises aluminium oxide, silicon carbide or a mixture thereof having a mean particle size of 60 to 160 µ-m.

After the spraying step, the impregnated paper is pressed to form a panel useful as a wear-resistant laminate flooring material.

VI. Applied Prior Art

1. US 3,135,643 (referred to herein as "Michl")
2. US 2,958,593 (referred to herein as "Hoover et al.")
3. US 5,344,704 (referred to herein as "O'Dell et al.")
4. US 5,034,272 (referred to herein as "Lindgren et al.)

VII. Issues

A. Whether claims 1, 3, 4 and 8 were properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Michl in view of Hoover et al., and further in view of O'Dell et al.

B. Whether claims 5 and 7 were properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Michl in view of Hoover et al. and Lindgren et al., and further in view of O'Dell et al.

VIII. Grouping of Claims

For purposes of this appeal, claims 3, 4 and 7 stand or fall with claim 1. Claims 1, 5 and 8 are separately argued.

IX. Argument

It is respectfully submitted that the Examiner has failed to establish a *prima facie* case for obviousness, no motivation having been found for modifying the base reference in the manner proposed by the Examiner. Therefore, the final rejection of the claims on appeal is improper and should be reversed.

A1. The Examiner's rationale underlying the rejection of claims 1, 3, 4 and 8 under 35 U.S.C. § 103(a).

Claims 1, 3, 4 and 8 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Michl in view of Hoover et al., and further in view of O'Dell et al. The Examiner's remarks in support of the rejection are as follows:

> As to claims 1, 3, Michl discloses a method of impregnating paper used for the production of wear-resistant laminate material (See column 1, lines 20-24; column 10, lines 71-75) comprising: a) taking print paper 12 (See Fig. 3; column 6, lines 16-27); b) damping and impregnating the paper 12 with melamine resin (See column 3, lines 65-67; column 5, lines 58-59) by the use of nip rolls 3, 4 to remove the resin in excess of 33-42 % resin content (See Fig. 1; column 5, lines 64-66), and c) additionally coating onto said damped wet print paper an additional layer of coating resin composition comprising 100 parts of melamine resin (See column 5, lines 16-19, 67-69) and 5-30 parts of the abrasive substance (See column 3, lines 33-42, 67-70; column 12, lines 1-3) using a knife coater (See

column 5, lines 67-70); wherein dry resin content of the impregnated print paper is 33-42 % (See column 5, lines 60-61) and the weight of dry coating is about 0.022-0.033 pound per square foot of the impregnated paper (See column 6, lines 1-3). Considering the fact that a surface weight (density) of print paper 12 used for impregnating with a resin usually is of about 80 g/m^2, as evidenced by Lindgren et al (See US 5,034,272, column 4, lines 21-27), final area density amounts to about 201 % since a surface weight (density) of dry coating is 0.022 pound per square foot (107 g/m^2) and a surface weight (density) of dry impregnated paper is 40 x 1.42 = 56 g/m^2.

It is the Examiner's position that the nip rolls 3, 4 for removing the excess of resin are in fact metering rollers, as evidenced by Varnell et al (US 5,142,151, Fig. 16; column 9, lines 64-68).

Michl fails to teach that: the step c) is carried out by spraying instead of knife coater; and the amino resin dispersion further comprises flow-promoting agent (Claim 1) such as polyglycol ether (Claim 4).

Hoover et al teach that uniform distribution of abrasive particles on the surface of a non-woven web (See column 6, lines 47-48) can be achieved by spraying a dispersion of abrasive particles in amino-containing resin with adjusted viscosity through nozzles while agitating the dispersion in a tank. The viscosity of the dispersion can be adjusted by addition of a flow-promoting agent such as polyglycol ether. See column 5, lines 24-40, 46-55; column 6, lines 31-46.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have added a flow-promoting agent such as polyglycol ether to an amino resin for adjusting the viscosity of the amino resin and sprayed the formed amino resin to a print paper of Michl with the expectation of achieving uniform distribution of abrasive particles on the surface of the print paper, as taught by Hoover et al.

As to intended use of the paper laminate, it is held that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Therefore, the claimed invention is not patentably distinguish over method of Michl in view of Hoover et al since there is no manipulative difference between the method of Michl in view of Hoover et al and that of the claimed invention.

As to claim 8, Michl further teaches that the impregnated paper coated with the dispersion containing the abrasive substance is pressed to form a panel (See column 3, lines 67-75; column 4, 1-2).

9. **Claim 2**[1] is rejected under 35 U.S.C. 103(a) as being unpatentable over Michl (US 3,135,643) in view of Hoover et al (US 2,958,593), as applied above, and further in view of O'Dell et al (US 5,344,704).

Michl in view of Hoover et al, as applied above, fails to teach that the coating resin composition further comprises 0.5-2.5 parts of silane adhesion promoter, 0.1-0.4 parts of a wetting agent, 0.05-0.4 parts of a separating agent and an amino resin hardener; and the flow-promoting agent is used in an amount of 5-25 parts.

O'Dell et al teach that according to a conventional practice, a protective coating composition comprising a dispersion of abrasive particles (See column 4, lines 26-36) is formulated with various

[1] The subject matter of claim 2 was incorporated into claim 1, and in the final rejection the Examiner made reference in her final rejection of claims 1, 3, 4 and 8 to the reasons of record set forth for claim 2 in the Office Action dated February 13, 2003.

conventional additives such as silane adhesion promoter for improving adhesion of the abrasive particles (See column 6, lines 11-15), a small amount of a wetting agent, humectant, mold release agent (a separating agent) and a catalyst (See column 6, lines 3-10) such as Nacure 3525 melamine resin curing catalyst (hardener) depending on intended use of a final coating composition (See column 10, line 24).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used conventional additives such as silane adhesion promoter, a wetting agent, humectant, mold release agent (a separating agent) and a resin curing catalyst (hardener) in a melamine resin composition of Michl in view of Hoover et al with the expectation of achieving benefits such as improved adhesion, better mold release and wetting, accelerated cure, etc., as taught by O'Dell et al.

The amounts of the conventional additives (the silane adhesion promoter, the flow-promoting agent, the wetting agent, the separating agent and the amino resin hardener) added to a resin composition would affect properties of the resin composition, i.e. the additive amounts are result-effective variables.

It is held that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA1977). See also In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Also, it is held that concentration limitations are obvious absent a showing of criticality. Akzo v. E.I. du Pont de Nemours 1 USPQ 2d 1704 (Fed. Cir. 1987).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have discovered by routine experimentation the optimum amount of additives (including claimed amounts) in a melamine resin composition of Michl in view of Hoover et al

depending on intended use of a final product, since general conditions are taught by O'Dell et al.[2] (emphasis in the original)

A2. The rejection of claims 1, 3, 4 and 8 under 35 U.S.C. § 103(a) is improper.

In pertinent part, the Examiner recognizes that Michl neither discloses or suggests step (c) of claim 1, i.e., additionally spraying onto the damped wet paper an additional layer of amino resin in a dispersion containing an abrasive substance and a flow-promoting agent.

> Michl fails to teach that: the step c) is carried out by spraying instead of knife coater; and the amino resin dispersion further comprises flow-promoting agent (Claim 1) such as polyglycol ether (Claim 4). (emphasis in the original)

Michl instead followed the above-discussed conventional practice of spreading the coating composition using a knife coater (col. 5, lines 67-70).

To overcome this deficiency, the Examiner looks to Hoover et al. for a teaching of spraying a resin-abrasive slurry in order to obtain a uniform coverage of a surface. In an effort to establish the motivation for the modification of Michl, the Examiner states:

> It would have been obvious to one of ordinary skill in the art at the time the invention was made to have added a flow-promoting agent such as polyglycol ether to an amino resin for adjusting the viscosity of the amino resin and sprayed the formed amino resin to a print paper of Michl

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[2] Office Action dated February 13, 2003, page 3, penultimate line through page 7, line 11.

with the expectation of achieving uniform distribution of abrasive particles on the surface of the print paper, as taught by Hoover et al.

Hoover et al., however, has nothing to do with the production of wear-resistant laminate flooring material. Hoover et al. instead relates to tools for floor maintenance. Consequently, the skilled person would not have looked to Hoover et al. for improvements relating to the production of wear-resistant laminate flooring material. There is lacking any reason to believe that the skilled person would expect the methodology taught by Hoover et al., that is directed to the formation of floor scouring structures, to be transportable to the production of a laminate flooring material taught by Michl.

Hoover et al. is non-analogous art. The only reason the Examiner found Hoover et al. in the first place is because of applicant's teachings, not because of some suggestion or motivation in the pertinent art. Hoover et al. is not in the field of applicant's endeavor, i.e., the the production of wear-resistant laminate flooring material. Hoover et al. does not address the problem addressed by applicant, i.e., avoiding the dulling of the surface of the wear-resistant laminates as arises from prior art methods of forming the wear-resistant laminates. Hoover et al. does teach spraying an abrasive containing material onto a substrate, but the substrate is structurally and functionally different from the resin impregnated paper of Michl. Instead, Hoover et al. sprays the abrasive containing material onto an "extremely open structure having an extremely high void volume" (col. 1, lines 14-17). The finished result is a very open structure with many interstices between adjacent fibers remaining unfilled by the binder

and abrasive particles (col. 3, lines 1-3). The voids make up at least three-quarters or four-fifths, or more, of the total volume occupied by the composite structure. This is clearly an application far remote from that of Michl which relates to laminate flooring that is obviously dense and not an "extremely open structure".

The Board's attention is also directed to the fact that Michl and Hoover et al. have been known for more than 40 years, and yet no one has sought to combine these references in the manner suggested by the Examiner to solve the problem addressed by applicant. This is strong objective evidence the rejection advance by the Examiner is based on the hindsight combination of non-analogous art.

Another significant fact is the Examiner could find no evidence in the relevant art of laminate flooring material production that it was known to spray a coating composition containing an abrasive substance on an amino resin impregnated paper for the production of a high wear resistant flooring material.

It is also noted that Michl teaches away from the use of a flow promoting agent in a coating composition. Instead, Michl teaches the addition of a water soluble thickening agent, which would retard flow rather than promote flow.

The addition of O'Dell et al. does not overcome the fundamental deficiency of the base combination, and thus O'Dell et al. does not render the method of claim 1 obvious. O'Dell et al., which happens to discuss Michl as background art, offers no suggestion of "spraying onto said damped wet paper an additional layer of amino resin in a dispersion containing an abrasive substance and a flow-promoting agent", nor does O'Dell et al.

address any problems associated with spraying. If anything, O'Dell et al. takes the skilled person down a different path than that mapped out by applicant.

For at least the foregoing reasons, the rejection of claim 1 should be reversed.

Claim 8, which depends from claim 1, adds the further act of pressing the impregnated paper to form a panel. This feature further distances the claimed subject matter from the teachings of Hoover et al.

B1. The Examiner's rationale underlying the rejection of claims 5 and 7 under 35 U.S.C. § 103(a).

Claims 5 and 7 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Michl in view of Hoover et al. and Lindgren et al., and further in view of O'Dell et al. The Examiner's remarks in support of the rejection are as follows:

> Michl in view of Hoover et al fails to teach that abrasive substance comprises: at least one of aluminum oxide and silicon carbide having a mean particle size of 60-160 microns (Claim 5), or a mixture of silicon carbide and aluminum oxide (Claim 7).
>
> Lindgren et al teach that abrasive particles such as silica, aluminum oxide and/or silicon carbide or a mixture of two or more are suitable in a method of making wear-resistant paper laminate under heat and pressure (See column 3, lines 19-50). In other words, silica abrasive particle is functionally equivalent to silicon carbide and/or aluminum oxide.
>
> It would have been obvious to one of ordinary skill in the art at the time of the invention was made to have used silicon carbide or aluminum oxide or a mixture thereof instead of silica in Michl in view of Hoover et al since silicon carbide and/or aluminum oxide is functionally equivalent to

silica, as shown by Lindgren et al, and the selection of any of these known abrasive particles would be within the level of ordinary skill in the art.

As to particle size being of 60-160 microns, Michl further teach that the maximum particle size of the silica is limited by processing rather than product considerations: the larger particle size results in higher abrasion resistance but at the same time abrades press pans of the laminating press (See column 9, lines 73-75; column 10, lines 1-12), i.e. the particle size of the silica is a result-effective variable. Lindgren et al also teach that the particle size of the abrasive particles is a result-effective variable: if abrasive particles are too big the surface of the laminate is rough and unpleasant, while too small particles give too low abrasion resistance so that the average particle size should be in the range of 1-80 microns (See column 3, lines 30-35).

It is held that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). See also In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have discovered the optimum or workable ranges of the particle size of the silica (including 1-80 microns of Lindgren et al or claimed 60-160 microns) in a method of Michl in view of Hoover et al by routine experimentation depending on intended use of a final product since general conditions are taught by Michl and Lindgren et al. [3]

Michl in view of Hoover et al and Lindgren et al fails to teach that the coating resin composition further comprises 0.5-2.5 parts of silane adhesion promoter, 0.1-0.4 parts of a wetting agent, 0.05-0.4 parts of a

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[3] Office Action dated February 13, 2003, page 7, line 12 through page 8, last line.

separating agent and an amino resin hardener; and the flow-promoting agent is used in an amount of 5-25 parts.

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used conventional additives such as silane adhesion promoter, a wetting agent, humectant, mold release agent (a separating agent) and a resin curing catalyst (hardener) in a melamine resin composition of Michl in view of Hoover et al and Lindgren et al with the expectation of achieving benefits such as improved adhesion, better mold release and wetting, accelerated cure, etc., as taught by O'Dell et al.

The amounts of the conventional additives (the silane adhesion promoter, the flow-promoting agent, the wetting agent, the separating agent and the amino resin hardener) added to a resin composition would affect properties of the resin composition, i.e. the additive amounts are result-effective variables.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have discovered by routine experimentation the optimum amount of additives (including claimed amounts) in a melamine resin composition of Michl in view of Hoover et al and Lindgren et al depending on intended use of a final product, since general conditions are taught by O'Dell et al. [4] (emphasis in the original)

B2. The rejection of claims 5 and 7 under 35 U.S.C. § 103(a) is improper.

The above traversal of the rejection of claim 1 is equally applicable to the rejection of claim 5. In addition, claim 5 specifies an abrasive substance comprising at least one of aluminium oxide and silicon carbide having a mean particle size of 60 to

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[4] Office Action dated July 16, 2003, page 3, line 6 through page 4, line 5.

160 μ-m. Admittedly, Lindgren et al. discloses a particle size range of 1-80 μ-m, while at the same time indicating a preferred particle size of 5-60 μ-m. This however reinforces the prior art bias toward the use a fine particle size, i.e., no greater than 60 μ-m. The method recited in claim 5 overcomes the prior art limitations on particle size and actually allows for advantageous use of particle sizes in the range of 60 to 160 μ-m. Accordingly, any combination of Lindgren et al. with the other prior art of references further leads the skilled person away from the application of a coating composition containing an abrasive material by spraying with the addition to the composition of a flow promoting agent as set forth in claim 5.

X. Conclusion

In view of the foregoing, it is respectfully submitted that the claims are patentable over the applied art and that the final rejections should be reversed.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By: _____

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CERTIFICATE OF MAILING

I hereby certify that this paper (along with any paper or item referred to as being attached or enclosed) is being deposited with the U.S. postal service on the date shown below with sufficient postage as first-class mail in an envelope addressed to Mail Stop Appeal Brief-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

Date: January 20, 2004

Don W. Bulson

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Appendix A

Claims on Appeal

1. A method of impregnating paper used for the production of wear-resistant laminate flooring material comprising:

a) taking paper;

b) damping and impregnating said paper with an amino resin by the use of metering rollers; and

c) additionally spraying onto said damped wet paper an additional layer of amino resin in a dispersion containing an abrasive substance and a flow-promoting agent; and

wherein the final area density relative to the dry mass of raw paper amounts to 100% to 250%; and wherein the dispersion comprises 100 parts of the amino resin, 20 to 95 parts of the abrasive substance, 0.5 to 2.5 parts of a silane adhesion promoter, 5 to 25 parts of a flow-promoting agent, 0.1 to 0.4 parts of a wetting agent, 0.05 to 0.4 parts of a separating agent and of an amino resin hardener.

3. A method according to claim 1, wherein a melamine resin is employed as the amino resin.

4. A method according to claim 1, wherein polyglycol ether, e-caprolactam or butane diol is employed as the flow-promoting agent.

5. A method of impregnating paper used for the production of wear-resistant laminate flooring material comprising:

a) taking paper;

b) damping and impregnating said paper with an amino resin by the use of metering rollers; and

c) additionally spraying onto said damped wet paper an additional layer of amino resin in a dispersion containing an abrasive substance;

wherein the final area density relative to the dry mass of raw paper amounts to 100% to 250%; ~~and~~ wherein the abrasive substance comprises at least one of aluminium oxide and silicon carbide having a mean particle size of 60 to 160 µ-m; and wherein the dispersion comprises 100 parts of the amino resin, 20 to 95 parts of the abrasive substance, 0.5 to 2.5 parts of a silane adhesion promoter, 5 to 25 parts of a flow-promoting agent, 0.1 to 0.4 parts of a wetting agent, 0.05 to 0.4 parts of a separating agent and of an amino resin hardener.

7. A method according to claim 1, wherein a mixture of silicon carbide and aluminium oxide is employed as the abrasive substance.

8. A method according to claim 1, wherein, after the spraying step, the impregnated paper is pressed to form a panel.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re PATENT application of:

Applicant:	Dieter Döhring
Application No:	09/647,129
Filing Date:	September 26, 2000
Title:	METHOD OF IMPREGNATING DECORATIVE PAPERS
Examiner:	Elena Tsoy
Art Unit:	1762
Docket No.	TURKP0114US

APPEAL BRIEF

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

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I. Real Party in Interest

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Neither appellant, appellant's legal representative, nor the assignee of the present application are aware of any appeals or interferences which will directly affect,

which will be directly affected by, or which will have a bearing on the Board's decision in the pending appeal.

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V. Summary of Invention Defined in the Claims on Appeal

The invention defined in the claims on appeal relates to a method of impregnating paper used for the production of highly wear-resistant laminate flooring materials.

Background

Various processes previously were used to produce wear-resistant decorative paper impregnates for laminate flooring materials. According to one such process, a patterned paper is impregnated with resin, and then an additional layer of a resin composition containing abrasive particles is applied using a knife coater or spreading rollers. A problem with these prior art processes has been a lack of homogeneity of the abrasive particles, this giving rise to substantial variations in wear resistance of the

laminate flooring materials. To reduce these variations, conventional practice was to add viscosity increasing substances to the resin composition coating, and to employ very fine abrasive particles to prevent them from being precipitated from the resin composition used to form the additional coating layer. This practice, however, led to an optical dulling of the surface of the laminate flooring materials.

The Invention

The invention provides a solution to the aforesaid problem, by enabling the production of a laminate flooring material with uniform and high wear-resistance without the dulling of the surface that plagued the prior art processes.

In accordance with the invention, a method according to the invention comprises:

a) taking paper;

b) damping and impregnating the paper with an amino resin by the use of metering rollers; and

c) additionally spraying onto the damped wet paper an additional layer of amino resin in a dispersion containing an abrasive substance and a flow-promoting agent.

The final area density relative to the dry mass of raw paper amounts to 100% to 250%, and the dispersion comprises 100 parts of the amino resin, 20 to 95 parts of the abrasive substance, 0.5 to 2.5 parts of a silane adhesion promoter, 5 to 25 parts of a flow-promoting agent, 0.1 to 0.4 parts of a wetting agent, 0.05 to 0.4 parts of a separating agent and of an amino resin hardener.

As is preferred, a melamine resin is employed as the amino resin, polyglycol ether, e-caprolactam or butane diol is employed as the flow-promoting agent.

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A. Whether claims 1, 3, 4 and 8 were properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Michl in view of Hoover et al., and further in view of O'Dell et al.

B. Whether claims 5 and 7 were properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Michl in view of Hoover et al. and Lindgren et al., and further in view of O'Dell et al.

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> As to claims 1, 3, Michl discloses a method of impregnating paper used for the production of wear-resistant laminate material (See column 1, lines 20-24; column 10, lines 71-75) comprising: a) taking print paper 12 (See Fig. 3; column 6, lines 16-27); b) damping and impregnating the paper 12 with melamine resin (See column 3, lines 65-67; column 5, lines 58-59) by the use of nip rolls 3, 4 to remove the resin in excess of 33-42 % resin content (See Fig. 1; column 5, lines 64-66), and c) additionally coating onto said damped wet print paper an additional layer of coating resin composition comprising 100 parts of melamine resin (See column 5, lines 16-19, 67-69) and 5-30 parts of the abrasive substance (See column 3, lines 33-42, 67-70; column 12, lines 1-3) using a knife coater (See

column 5, lines 67-70); wherein dry resin content of the impregnated print paper is 33-42 % (See column 5, lines 60-61) and the weight of dry coating is about 0.022-0.033 pound per square foot of the impregnated paper (See column 6, lines 1-3). Considering the fact that a surface weight (density) of print paper 12 used for impregnating with a resin usually is of about 80 g/m^2, as evidenced by Lindgren et al (See US 5,034,272, column 4, lines 21-27), final area density amounts to about 201 % since a surface weight (density) of dry coating is 0.022 pound per square foot (107 g/m^2) and a surface weight (density) of dry impregnated paper is 40 x 1.42 = 56 g/m^2.

It is the Examiner's position that the nip rolls 3, 4 for removing the excess of resin are in fact metering rollers, as evidenced by Varnell et al (US 5,142,151, Fig. 16; column 9, lines 64-68).

Michl fails to teach that: the step c) is carried out by spraying instead of knife coater; and the amino resin dispersion further comprises flow-promoting agent (Claim 1) such as polyglycol ether (Claim 4).

Hoover et al teach that uniform distribution of abrasive particles on the surface of a non-woven web (See column 6, lines 47-48) can be achieved by spraying a dispersion of abrasive particles in amino-containing resin with adjusted viscosity through nozzles while agitating the dispersion in a tank. The viscosity of the dispersion can be adjusted by addition of a flow-promoting agent such as polyglycol ether. See column 5, lines 24-40, 46-55; column 6, lines 31-46.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have added a flow-promoting agent such as polyglycol ether to an amino resin for adjusting the viscosity of the amino resin and sprayed the formed amino resin to a print paper of Michl with the expectation of achieving uniform distribution of abrasive particles on the surface of the print paper, as taught by Hoover et al.

As to intended use of the paper laminate, it is held that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Therefore, the claimed invention is not patentably distinguish over method of Michl in view of Hoover et al since there is no manipulative difference between the method of Michl in view of Hoover et al and that of the claimed invention.

As to claim 8, Michl further teaches that the impregnated paper coated with the dispersion containing the abrasive substance is pressed to form a panel (See column 3, lines 67-75; column 4, 1-2).

9. **Claim 2**[1] is rejected under 35 U.S.C. 103(a) as being unpatentable over Michl (US 3,135,643) in view of Hoover et al (US 2,958,593), as applied above, and further in view of O'Dell et al (US 5,344,704).

Michl in view of Hoover et al, as applied above, fails to teach that the coating resin composition further comprises 0.5-2.5 parts of silane adhesion promoter, 0.1-0.4 parts of a wetting agent, 0.05-0.4 parts of a separating agent and an amino resin hardener; and the flow-promoting agent is used in an amount of 5-25 parts.

O'Dell et al teach that according to a conventional practice, a protective coating composition comprising a dispersion of abrasive particles (See column 4, lines 26-36) is formulated with various

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[1] The subject matter of claim 2 was incorporated into claim 1, and in the final rejection the Examiner made reference in her final rejection of claims 1, 3, 4 and 8 to the reasons of record set forth for claim 2 in the Office Action dated February 13, 2003.

conventional additives such as silane adhesion promoter for improving adhesion of the abrasive particles (See column 6, lines 11-15), a small amount of a wetting agent, humectant, mold release agent (a separating agent) and a catalyst (See column 6, lines 3-10) such as Nacure 3525 melamine resin curing catalyst (hardener) depending on intended use of a final coating composition (See column 10, line 24).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used conventional additives such as silane adhesion promoter, a wetting agent, humectant, mold release agent (a separating agent) and a resin curing catalyst (hardener) in a melamine resin composition of Michl in view of Hoover et al with the expectation of achieving benefits such as improved adhesion, better mold release and wetting, accelerated cure, etc., as taught by O'Dell et al.

The amounts of the conventional additives (the silane adhesion promoter, the flow-promoting agent, the wetting agent, the separating agent and the amino resin hardener) added to a resin composition would affect properties of the resin composition, i.e. the additive amounts are result-effective variables.

It is held that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA1977). See also In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Also, it is held that concentration limitations are obvious absent a showing of criticality. Akzo v. E.I. du Pont de Nemours 1 USPQ 2d 1704 (Fed. Cir. 1987).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have discovered by routine experimentation the optimum amount of additives (including claimed amounts) in a melamine resin composition of Michl in view of Hoover et al

depending on intended use of a final product, since general conditions are taught by O'Dell et al.[2] (emphasis in the original)

A2. The rejection of claims 1, 3, 4 and 8 under 35 U.S.C. § 103(a) is improper.

In pertinent part, the Examiner recognizes that Michl neither discloses or suggests step (c) of claim 1, i.e., additionally spraying onto the damped wet paper an additional layer of amino resin in a dispersion containing an abrasive substance and a flow-promoting agent.

> Michl fails to teach that: the step c) is carried out by spraying instead of knife coater; and the amino resin dispersion further comprises flow-promoting agent (Claim 1) such as polyglycol ether (Claim 4). (emphasis in the original)

Michl instead followed the above-discussed conventional practice of spreading the coating composition using a knife coater (col. 5, lines 67-70).

To overcome this deficiency, the Examiner looks to Hoover et al. for a teaching of spraying a resin-abrasive slurry in order to obtain a uniform coverage of a surface. In an effort to establish the motivation for the modification of Michl, the Examiner states:

> It would have been obvious to one of ordinary skill in the art at the time the invention was made to have added a flow-promoting agent such as polyglycol ether to an amino resin for adjusting the viscosity of the amino resin and sprayed the formed amino resin to a print paper of Michl

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[2] Office Action dated February 13, 2003, page 3, penultimate line through page 7, line 11.

with the expectation of achieving uniform distribution of abrasive particles on the surface of the print paper, as taught by Hoover et al.

Hoover et al., however, has nothing to do with the production of wear-resistant laminate flooring material. Hoover et al. instead relates to tools for floor maintenance. Consequently, the skilled person would not have looked to Hoover et al. for improvements relating to the production of wear-resistant laminate flooring material. There is lacking any reason to believe that the skilled person would expect the methodology taught by Hoover et al., that is directed to the formation of floor scouring structures, to be transportable to the production of a laminate flooring material taught by Michl.

Hoover et al. is non-analogous art. The only reason the Examiner found Hoover et al. in the first place is because of applicant's teachings, not because of some suggestion or motivation in the pertinent art. Hoover et al. is not in the field of applicant's endeavor, i.e., the the production of wear-resistant laminate flooring material. Hoover et al. does not address the problem addressed by applicant, i.e., avoiding the dulling of the surface of the wear-resistant laminates as arises from prior art methods of forming the wear-resistant laminates. Hoover et al. does teach spraying an abrasive containing material onto a substrate, but the substrate is structurally and functionally different from the resin impregnated paper of Michl. Instead, Hoover et al. sprays the abrasive containing material onto an "extremely open structure having an extremely high void volume" (col. 1, lines 14-17). The finished result is a very open structure with many interstices between adjacent fibers remaining unfilled by the binder

and abrasive particles (col. 3, lines 1-3). The voids make up at least three-quarters or four-fifths, or more, of the total volume occupied by the composite structure. This is clearly an application far remote from that of Michl which relates to laminate flooring that is obviously dense and not an "extremely open structure".

The Board's attention is also directed to the fact that Michl and Hoover et al. have been known for more than 40 years, and yet no one has sought to combine these references in the manner suggested by the Examiner to solve the problem addressed by applicant. This is strong objective evidence the rejection advance by the Examiner is based on the hindsight combination of non-analogous art.

Another significant fact is the Examiner could find no evidence in the relevant art of laminate flooring material production that it was known to spray a coating composition containing an abrasive substance on an amino resin impregnated paper for the production of a high wear resistant flooring material.

It is also noted that Michl teaches away from the use of a flow promoting agent in a coating composition. Instead, Michl teaches the addition of a water soluble thickening agent, which would retard flow rather than promote flow.

The addition of O'Dell et al. does not overcome the fundamental deficiency of the base combination, and thus O'Dell et al. does not render the method of claim 1 obvious. O'Dell et al., which happens to discuss Michl as background art, offers no suggestion of "spraying onto said damped wet paper an additional layer of amino resin in a dispersion containing an abrasive substance and a flow-promoting agent", nor does O'Dell et al.

address any problems associated with spraying. If anything, O'Dell et al. takes the skilled person down a different path than that mapped out by applicant.

For at least the foregoing reasons, the rejection of claim 1 should be reversed.

Claim 8, which depends from claim 1, adds the further act of pressing the impregnated paper to form a panel. This feature further distances the claimed subject matter from the teachings of Hoover et al.

B1. The Examiner's rationale underlying the rejection of claims 5 and 7 under 35 U.S.C. § 103(a).

Claims 5 and 7 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Michl in view of Hoover et al. and Lindgren et al., and further in view of O'Dell et al. The Examiner's remarks in support of the rejection are as follows:

> Michl in view of Hoover et al fails to teach that abrasive substance comprises: at least one of aluminum oxide and silicon carbide having a mean particle size of 60-160 microns (Claim 5), or a mixture of silicon carbide and aluminum oxide (Claim 7).
>
> Lindgren et al teach that abrasive particles such as silica, aluminum oxide and/or silicon carbide or a mixture of two or more are suitable in a method of making wear-resistant paper laminate under heat and pressure (See column 3, lines 19-50). In other words, silica abrasive particle is functionally equivalent to silicon carbide and/or aluminum oxide.
>
> It would have been obvious to one of ordinary skill in the art at the time of the invention was made to have used silicon carbide or aluminum oxide or a mixture thereof instead of silica in Michl in view of Hoover et al since silicon carbide and/or aluminum oxide is functionally equivalent to

silica, as shown by Lindgren et al, and the selection of any of these known abrasive particles would be within the level of ordinary skill in the art.

As to particle size being of 60-160 microns, Michl further teach that the maximum particle size of the silica is limited by processing rather than product considerations: the larger particle size results in higher abrasion resistance but at the same time abrades press pans of the laminating press (See column 9, lines 73-75; column 10, lines 1-12), i.e. the particle size of the silica is a result-effective variable. Lindgren et al also teach that the particle size of the abrasive particles is a result-effective variable: if abrasive particles are too big the surface of the laminate is rough and unpleasant, while too small particles give too low abrasion resistance so that the average particle size should be in the range of 1-80 microns (See column 3, lines 30-35).

It is held that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). See also In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have discovered the optimum or workable ranges of the particle size of the silica (including 1-80 microns of Lindgren et al or claimed 60-160 microns) in a method of Michl in view of Hoover et al by routine experimentation depending on intended use of a final product since general conditions are taught by Michl and Lindgren et al. [3]

Michl in view of Hoover et al and Lindgren et al fails to teach that the coating resin composition further comprises 0.5-2.5 parts of silane adhesion promoter, 0.1-0.4 parts of a wetting agent, 0.05-0.4 parts of a

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[3] Office Action dated February 13, 2003, page 7, line 12 through page 8, last line.

separating agent and an amino resin hardener; and the flow-promoting agent is used in an amount of 5-25 parts.

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used conventional additives such as silane adhesion promoter, a wetting agent, humectant, mold release agent (a separating agent) and a resin curing catalyst (hardener) in a melamine resin composition of Michl in view of Hoover et al and Lindgren et al with the expectation of achieving benefits such as improved adhesion, better mold release and wetting, accelerated cure, etc., as taught by O'Dell et al.

The amounts of the conventional additives (the silane adhesion promoter, the flow-promoting agent, the wetting agent, the separating agent and the amino resin hardener) added to a resin composition would affect properties of the resin composition, i.e. the additive amounts are result-effective variables.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have discovered by routine experimentation the optimum amount of additives (including claimed amounts) in a melamine resin composition of Michl in view of Hoover et al and Lindgren et al depending on intended use of a final product, since general conditions are taught by O'Dell et al. [4] (emphasis in the original)

B2. The rejection of claims 5 and 7 under 35 U.S.C. § 103(a) is improper.

The above traversal of the rejection of claim 1 is equally applicable to the rejection of claim 5. In addition, claim 5 specifies an abrasive substance comprising at least one of aluminium oxide and silicon carbide having a mean particle size of 60 to

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[4] Office Action dated July 16, 2003, page 3, line 6 through page 4, line 5.

160 μ-m. Admittedly, Lindgren et al. discloses a particle size range of 1-80 μ-m, while at the same time indicating a preferred particle size of 5-60 μ-m. This however reinforces the prior art bias toward the use a fine particle size, i.e., no greater than 60 μ-m. The method recited in claim 5 overcomes the prior art limitations on particle size and actually allows for advantageous use of particle sizes in the range of 60 to 160 μ-m. Accordingly, any combination of Lindgren et al. with the other prior art of references further leads the skilled person away from the application of a coating composition containing an abrasive material by spraying with the addition to the composition of a flow promoting agent as set forth in claim 5.

X. Conclusion

In view of the foregoing, it is respectfully submitted that the claims are patentable over the applied art and that the final rejections should be reversed.

Respectfully submitted,

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Date: January 20, 2004

Don W. Bulson

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Appendix A

Claims on Appeal

1. A method of impregnating paper used for the production of wear-resistant laminate flooring material comprising:

a) taking paper;

b) damping and impregnating said paper with an amino resin by the use of metering rollers; and

c) additionally spraying onto said damped wet paper an additional layer of amino resin in a dispersion containing an abrasive substance and a flow-promoting agent; and

wherein the final area density relative to the dry mass of raw paper amounts to 100% to 250%; and wherein the dispersion comprises 100 parts of the amino resin, 20 to 95 parts of the abrasive substance, 0.5 to 2.5 parts of a silane adhesion promoter, 5 to 25 parts of a flow-promoting agent, 0.1 to 0.4 parts of a wetting agent, 0.05 to 0.4 parts of a separating agent and of an amino resin hardener.

3. A method according to claim 1, wherein a melamine resin is employed as the amino resin.

4. A method according to claim 1, wherein polyglycol ether, e-caprolactam or butane diol is employed as the flow-promoting agent.

5. A method of impregnating paper used for the production of wear-resistant laminate flooring material comprising:

a) taking paper;

b) damping and impregnating said paper with an amino resin by the use of metering rollers; and

c) additionally spraying onto said damped wet paper an additional layer of amino resin in a dispersion containing an abrasive substance;

wherein the final area density relative to the dry mass of raw paper amounts to 100% to 250%; ~~and~~ wherein the abrasive substance comprises at least one of aluminium oxide and silicon carbide having a mean particle size of 60 to 160 µ-m; and wherein the dispersion comprises 100 parts of the amino resin, 20 to 95 parts of the abrasive substance, 0.5 to 2.5 parts of a silane adhesion promoter, 5 to 25 parts of a flow-promoting agent, 0.1 to 0.4 parts of a wetting agent, 0.05 to 0.4 parts of a separating agent and of an amino resin hardener.

7. A method according to claim 1, wherein a mixture of silicon carbide and aluminium oxide is employed as the abrasive substance.

8. A method according to claim 1, wherein, after the spraying step, the impregnated paper is pressed to form a panel.